



Real-World **PHP**

Computer Science 50, Fall 2008

Keito Uchiyama

<keito at cs.harvard.edu>

The Real World

- What's so special about The Real World?
 - Lots more users (hopefully)
 - Frequent requests
 - Evil users

Topics

- Performance
- Security
- Templating

Performance

- How can we improve PHP performance?
 - Remove unnecessary code
 - Remove bottlenecks
 - Throw software at the problem

Remove bottlenecks

- Common bottlenecks
 - Disk
 - The PHP interpreter
 - Network
 - MySQL
- How can we remove these bottlenecks?
 - Optimize code
 - Cache requests to outside servers
 - Write better SQL

Bottleneck 1: Disk

- An online spellchecker
- A zip code table in a CSV file (Problem Set 8)

Bottleneck 2: The PHP Interpreter

- PHP is interpreted. Code has to be "compiled" on the fly to bytecode every time
- But code rarely changes!
- Solutions
 - Templating
 - PHP accelerators

Bottleneck 3: Network

- Networks are slow. Especially the interwebs!

```
function goGetLolCat();
{
    $xml = new SimpleXMLElement(file_get_contents("http://feedproxy.google.com/
ICanHasCheezburger?format=xml"));
    $item = $xml->channel->item[0];
    $title = htmlspecialchars(substr($item->description, strpos($item-
>description, "-") + 2), ENT_QUOTES);
    $link = $item->link;

    return "<a class='img' href='{ $link }'><img alt='{ $title }' border='0' src='" .
$attributes["url"] . "' /></a>";
}
```


Solution: Caching

- Prevent your code from fetching the same data across the network every time

```
define('CACHEFILE', 'lolcat.html');
define('MAXCACHETIME', 24 * 60 * 60); //Cache for 24 hours

if (filemtime(CACHEFILE) < time() - MAXCACHETIME) {
    //Cache is stale
    $loldata = goGetLolCat();
    file_put_contents(CACHEFILE, $loldata); //Cache loldata for later
} else {
    //Cache is still less than 24 hours old
    $loldata = file_get_contents(CACHEFILE); //Read in loldata from cache
}

echo $loldata;
```

Bottleneck 4: MySQL

- Don't fetch too much data (too many rows or columns)
 - Too many columns:
`SELECT * FROM students;`
 - Too many rows:
`SELECT * FROM students WHERE student_username = 'jharvard';`

Bottleneck 4: MySQL

- Use indexes!
- Types of indexes:
 - PRIMARY KEY
 - UNIQUE
 - INDEX
 - FULLTEXT
- What indexes to create
- Make MySQL EXPLAIN itself

Security

- Potential exploits
 - SQL injection
 - Cross-site scripting (XSS)
 - Invalid values

Security: Example 1

```
$username = $_GET['username'];  
$sql = sprintf("SELECT * FROM Students WHERE  
    username = '%s'", $username);
```

What if the user types in:

Robert

```
SELECT * FROM Students WHERE username = 'Robert';
```



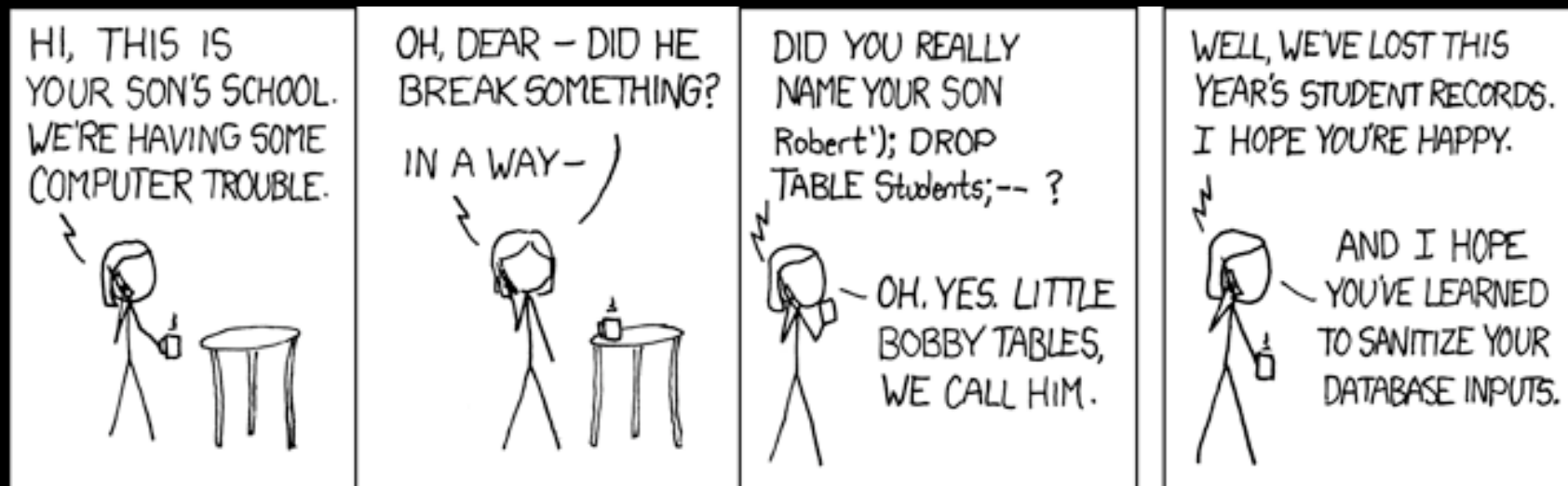
EEK!

But! What if the user types in:

Robert'; DROP TABLE Students; --

```
SELECT * FROM Students WHERE username = 'Robert'; DROP TABLE  
Students; --';
```

Security: Example 1



Security: Example 2

```
//In register.php...  
$username = $_GET['username'];  
Store_username_in_Database($username);
```

```
//In listusers.php...  
foreach ($users as $user)  
    echo $user->name;
```

What if user types in:

```
<script>alert('Pwned!');SendUserCookiesToBadSite();</script>
```

Security: Example 2

- Google search
- Gmail
- Yahoo! Mail
- Facebook
- MySpace
- Orkut
- TJMaxx
- Paypal
- Nokia
- eBay
- Microsoft Xbox
- Wikipedia
- Netscape
- Sourceforge

Security: Example 3

```
$numshares =  
    mysql_real_escape_string($_GET['shares']);  
$sql = "INSERT INTO Shares (name, shares) VALUES  
    ('GOOG', $numshares);"
```

How can we do better?

- Regular expressions
- `is_numeric()`
- Check bounds
- `filter_var()`

Templating

- Lets you keep your logic and presentation separate
- Write cleaner code. No more ugly `<?php ?>` blocks in your presentation code.
- Bonus: Caches constant data for you so your code ends up running faster!

Templating: Smarty

Basic steps:

- Initialize Smarty engine
- Initialize variables
- Display template (a .tpl file)

Templating: Smarty: Example (PHP)

```
//Get menu from database and print in table
$sql = 'SELECT dish_id, dish_name, dish_rating
FROM dishes...';
if ($result = mysql_query($sql)) {
    $dishes = array();
    while ($row = mysql_fetch_assoc($result)) {
        $dishes[] = $row;
    }
    $smarty->assign('dishes', $dishes);
}
```

Templating: Smarty: Example (TPL)

```
{if isset($dishes) }  
  <table class="menutable">  
    {foreach from=$dishes item=dish}  
      <tr>  
        <td><a href="/dish/{ $dish.dish_id }">{ $dish.dish_name |  
htmlspecialchars}</a></td>  
        <td>{stars rating=$dish.dish_rating}</td>  
      </tr>  
    {/foreach}  
  </table>  
{else}  
  <p>No food is available at HUDS at this time!</p>  
{/if}
```

Templating: Smarty

- <http://www.smarty.net/>
- Quick Install Guide

The Real World

- Never assume.
- Always doubt.
- Have fun*.



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